Water Resources NSDI Node

State Soil Geographic (STATSGO) Data Base for the Conterminous United States

Available as - [Outline] - [Parseable text] - [SGML]

Metadata:

Identification_Information:
Citation:
Citation_Information:
Originator: Schwarz, G.E. and Alexander, R.B.
Publication_Date: 19950901
Title:
State Soil Geographic (STATSGO) Data Base for the Conterminous United States
Edition: 1.1
Geospatial_Data_Presentation_Form:
Series_Name Open-File Report Issue_Identification 95-449
Publication_Information:
Publication_Place: Reston, VA
Publisher: U.S. Geological Survey
Online_Linkage: <http://water.usgs.gov/lookup/getspatial?ussoils>
Description:
Abstract:
USSOILS is an Arc 7.0 coverage containing hydrology-relevant information for 10,498 map units covering the entire conterminous United States. The coverage was compiled from individual State coverages contained in the October 1994 State Soil Geographic (STATSGO) Data Base produced on CD-ROM. The geo-dataset USSOILS.PAT relates (on the basis of a map unit identifier) the 10,498 map units to 78,518 polygons. The scale of the geo-dataset is 1:250,000. The INFO attribute table USSOILS.MUID_ATTS contains selected variables from the STATSGO data set for 10,501 map units (an extra 3 map units are contained in the attribute table that are not in the geo-dataset - see the 'Procedures' section below), including: the map unit

identifier, a 2-character state abbreviation, available water capacity of the soil, percent clay in the soil, the actual k-factor used in the water erosion component of the universal soil loss equation, the organic material in soil, soil permeability, cumulative thickness of all soil layers, hydrologic characteristics of the soil, quality of drainage, surface slope, liquid limit of the soil, share of a map unit having hydric soils, and the annual frequency of flooding. To facilitate mapping the attribute data, the narrative section below contains instructions for transferring the information contained in the attribute table USSOILS.MUID_ATTS to the polygon attribute table USSOILS.PAT. STATSGO United States Soil Water Capacity Clay Organic material Permeability Infiltration Drainage Hydric Flood frequency Slope

Purpose:

The USSOILS coverage was originally compiled to support a national model of water quality. The model uses the soil characteristics contained in this coverage to mediate deliveries of nonpoint source pollution to stream and river segments in the RF1 data base. The National Resource Conservation Service (NRCS) recommends that any maps using NRCS STATSGO data show the source and date, and provide the following statement:

"STATSGO is designed to support regional, multistate, State, and river basin resource planning, management and monitoring."

Supplemental_Information:

Procedures_Used: The individual State coverages are from the State Soil Geographic (STATSGO) CD-ROM data base, issued by U.S. Department of Agriculture, NRCS National Cartography and GIS Center, P.O. Box 6567, Fort Worth, Texas 76115-0567, 1-800-672-5559 (U.S. Department of Agriculture, 1991). The CD-ROM coverage for New Mexico was defective and was not used. A corrected copy of the New Mexico coverage was obtained from Norman Bliss of the EROS Data Center ((605) 594-6034). The STATSGO State-based coverages were merged together into a national coverage using the Arc MAPJOIN command. All nodes along merged boundaries were checked and edited to remove any superfluous nodes created during the mapjoin process, and to ensure arcs properly merged along and across State boundaries. The joining process preserved all State boundaries.

To understand the procedures used to create the attribute table USSOILS.MUID_ATTS, it helps to have an understanding of the STATSGO data structure. The smallest spatial entity mapped within the STATSGO dataset is called a map unit, of which there are 10,498 broken out into 78,518 polygons within the conterminous United States. Each map unit consists of up to 21 components. Components are used to apportion different characteristics of a map unit and do not represent a separate spatial entity. To help understand this, consider a map unit that has only two components. Suppose 30 percent of this map unit contains soil of type A and the remaining 70 percent contains soil of type B. Thus, component 1 of the map unit would have soil type A and component 2 would have soil type B. The data base would record the soil type for each component, along with the percentage of the map unit represented by each component (in this example, 30 percent for component 1 and 70 percent for component 2). The specific locations of soil types A and B are not spatially defined in the data base.

Each component is further delineated into a maximum of 6 layers, corresponding to

distinct soil layers. Soil characteristics recorded for a layer typically consist of a high and low value, which describes a range for that characteristic within that layer. Included among the characteristics of the soil layer is the thickness of the layer.

In developing the USSOILS.MUID_ATTS table, it is necessary to aggregate the layer and component information up to the level of a map unit. To aggregate layer information to the component level, we first construct a simple average of the high and low values of a characteristic for each layer. We then construct a weighted average across all layers of the layer-specific characteristic averages, the weights being the thickness of the layer relative to the total thickness of all layers. For component-level information that is expressed as a range, we construct a simple average of the high and low values defining the range. These steps reduce layer-specific information and ranges of component-specific information into a single datum of component-specific information for each characteristic in the data base. Finally, to obtain map unit information, we construct a weighted average across all components of the component-specific information, the weights being the component percentages given for the map unit.

Included in the Notes section below are the computer programs used to construct the USSOILS.MUID_ATTS data base, along with an AML program for transferring this information to the polygon attribute table USSOILS.PAT. We ask the reader to refer to the documentation contained in these programs to obtain detailed information on the methods used to construct each data item. The following is a brief description of how the programs were used.

The AMLs "layer_out.aml" and "comp_out.aml" were run using the UNIX batch program "batch.prog" to write data from the STATSGO State INFO layer and comp files into ascii files. The ascii files were read by the SAS program "setussoils.sas" to aggregate data from the layer and component level to the map unit level. If there is no information available to determine a characteristic's value in a given map unit, the characteristic is given the value -0.1 to indicate a missing value. The program "setussoils.sas" creates an ascii, comma-delimited file and a SAS file of the aggregated, map unit data containing information for 10,470 map units. The comma-delimited, ascii file is then read back into ARC/INFO using the aml "ussoils_muid_atts.aml" to create the attribute table USSOILS.MUID_ATTS. Note that there is a discrepancy between the number of map units contained in the combined COMP and LAYER files (10,470) and the number contained in the polygon attribute table (PAT) USSOILS.PAT (10,498 broken out into 78,518 polygons). The discrepancy arises because 3 map units in the COMP and LAYER files were not included in the PAT (these are - VT029, UTWA1 (not in LAYER file either), and NE165 (not in LAYER file either)), while 31 map units in the PAT coverage were not in the COMP or LAYER files. The 31 map units missing from the COMP and LAYER files are all "water" designated map units for which the values of all items are missing. To assure that the attribute table is complete, the program 'ussoils_muid_atts.aml' appends the missing MUIDs from USSOILS.PAT to USSOILS.MUID_ATTS and sets the attribute values (except for STATE) to missing. Thus, the total number of map units contained in USSOILS.MUID_ATTS is 10,501 (10,470 + 31). We made no attempts to correct the USSOILS.PAT file for the 3 missing map units contained in the COMP and LAYER files and in the attribute table USSOILS.MUID_ATTS.

To assist the user in mapping the attribute information, we include the program 'ussoils_atts.aml' in the "Notes" section. This program relates the attribute information for the 10,498 "mapped" map units (10,501 - 3) to the 78,518 polygons contained in the polygon attribute table USSOILS.PAT. This program may be run as an AML from the command line in ARC by entering the command: &r ussoils_atts.

Revisions: 1.0 Original Version 1.1 Changed the documentation and coverages in accordance with comments received from reviewers. Created the INFO file USSOILS.MUID_ATTS containing the attribute information for 10,501 map units. Deleted this information from the polygon attribute table USSOILS.PAT. Changed the programs and documentation to reflect this change in file structure.

Reviews_Applied_to_Data: Summary of review by Ken Lanfear, Network Info Products Coordinator, Reston, VA, August 21, 1995.

Ken reviewed the metadata for the State Soil Geographic (STATSGO) Data Base for the Conterminous United States, and the associated coverage, ussoils.

He viewed the coverage on a computer screen to ensure arcs were present for the 48 conterminous States and the District of Columbia (included in Maryland). He selected several States by Mapping Unit ID (MUID) and plotted polygons to check that the states were complete and that mapping units plotted in the correct state. He also examined the polygon attribute table, USSOILS.PAT, to note record counts and verify the format. He spot checked one mapping unit (TX118) against the original data (which was on line) and verified that the HYGRP and DRAIN items were computed correctly.

He read the procedures included under supplementary information, and concurs with the overall processing steps. However, time did not permit him to check details of the coding.

Ken found one possible discrepancy: There are 10,499 (actually 10,498 if we exclude the null map unit consisting of the "outer" polygon to the coverage) unique MUID's in the USSOILS.PAT file, but only 10,470 in the SOIL_ATTS file. He inquired where the 29 extra units came from?

Ken emphasized that the narrative portion should be modified to make it clear that each mapping unit can be comprised of several polygons. This caused him some confusion initially.

Ken had a suggestion for reducing the size of the coverage. Instead of appending all the items of SOIL_ATTS to USSOILS.PAT, why not just rename SOIL_ATTS to USSOILS.SOIL_ATTS ? This file would export with the coverage. By copying to the .PAT, the values are repeated an average of about 7.8 times. However, since the current form of ussoils is large but workable, he made this suggestion optional.

Summary of review by Barb Ruddy, Hydrologist, Lakewood, CO, August 31, 1995.

Barb looked at the programs to make sure they made sense. She found the programs to be well documented and the procedures to be appropriate for aggregating the comp

and layer information to a single map unit value. She checked the values for the variable hygrp and found they were comparable to the analysis that she and Bill Battaglin had done. She also looked at how the data plotted nationally and it checked.

Barb's main concern was the inefficient storage of the attribute information. Because each map unit is repeated multiple times in the PAT file, she suggested that the attribute data could be more efficiently stored in an info file.

Related_Spatial_and_Tabular_Data_Sets: None

Other_References_Cited: U.S. Department of Agriculture, National Resource Conservation Service, National Soil Survey Center, 1991, "State Soil Geographic (STATSGO) Data Base: Data use information," Miscellaneous Publication Number 1492, 110 p. (Revised July 1994.)

Notes: The AMLs and SAS programs used to create USSOILS.MUID_ATTS and to transfer the attribute information to the polygon attribute table USSOILS.PAT are given below. Please refer to the documentation contained in these programs for information on variable descriptions, and computation methods.

1. The AML "layer_out.aml" used to unload selected items from the individual STATSGO State layer files into a single ascii data set.

/*---------- /* /* Command name: LAYER_OUT.AML /* Language: AML /* /*:::::::::: /* /* Purpose: Program outputs soil LAYER data for processing in SAS. /* /*:::::::::: /* /* Comments: /* 1. Item description: /* LAYDEPH,LAYDEPL = layer depth high,low values /* AWC = available water capacity (inches/inch) /* CLAY = clay content of soil (% of soil < 2mm in size) /* KFFACT = soil erodibility f-factor /* OM = organic matter content (% by weight) /* PERM = permeability rates (inches/hour) /* LL = liquid limit of the soil (%moisture by weight) /* /*:::::::::: /* /* History: /* Author/Site, Date, Event /* ---------- /* R. Alexander/G. Schwarz 04/18/95 CREATED /*:::::::::: &sv STATEUP := [TRANSLATE [response 'ENTER STATE']] &DATA arc info ARC /* CALC $NM = 1 CALC $COMMA-SWITCH = -1 CALC $PRINTER-SIZE = 200 /*==========
SEL LAYER OUTPUT /srv3/bsa/gschwarz/statsgo/LAYER.%STATEUP% INIT PRINT MUID,SEQNUM,LAYDEPH,LAYDEPL,AWCH,~ AWCL,CLAYH,CLAYL,KFFACT,OMH,OML,~ PERMH,PERML,LLH,LLL /* Q STOP &END &RETURN

2. The AML "comp_out.aml" used to unload selected items from the individual STATSGO State component files into a single ascii data set.

/*---------- /* /* Command name: COMP_OUT.AML /* Language: AML /* /*:::::::::: /* /* Purpose: Program

outputs soil COMP data for processing in
SAS. /* /*::: /* /* Comments: /* 1. Output data are averages of high and low values /* /* 2. Item description: /* MUID = Mapunit identifier /* SEQNUM = component identifier /* COMPNAME = Name of the component /* COMPKIND = Description of the kind of component /* COMPPCT = Percent of mapunit represented by component /* DRAINAGE = Drainage quality (1=well drained to 7=poorly drained) /* HYDGRP = soil index variables (1=well drained to 4=poorly drained) /* HYDRIC = hydric soil indicator (1 if hydric) /* ANFLOOD = Annual flood frequency (1 = frequent (>50% chance) /* 2 = occasional (5-50% chance), 3 = rare (<5% chance)) /* SLOPE = Slope of surface (percent) /* /*::: /* /* History: /* Author/Site, Date, Event /* ---------- /* R. Alexander/G. Schwarz 04/18/95
CREATED /*::: &sv STATEUP := [TRANSLATE [response 'ENTER STATE']] /* &DATA arc info ARC /* CALC $NM = 1 CALC $COMMA-SWITCH = -1 CALC $PRINTER-SIZE = 200 /*==========
SEL COMP CALC SLOPE = (SLOPEL + SLOPEH) / 2 /*
OUTPUT /srv3/bsa/gschwarz/statsgo/COMP.%STATEUP% INIT PRINT MUID,SEQNUM,COMPNAME,COMPKIND,~
COMPPCT,DRAINAGE,HYDGRP,HYDRIC,~ SLOPE,ANFLOOD /* Q STOP
&END &RETURN

3. The program "batch.prog" is used to run the AML's "layer_out.aml" and "comp_out.aml" to create individual layer and comp files for each state. The resulting state files will be read by the SAS program "setussoils.sas."

#./bin/ksh
#
PROGRAM : BATCH.PROG # # DATE : 04/18/95 # # PURPOSE : THIS PROGRAM PROCESSES STATSGO AML OUTPUT PROGRAMS# # FOR EACH OF THE STATES. # # THE PROGRAM CHANGES THE READ/WRITE ATTRIBUTES OF # # THE STATSGO STATE DIRECTORIES AND # # DIRECTS THE LOOP VALUES TO THE AML #
##

for state in al ar az ca co ct de fl ga ia id il in ks ky la ma md me mi \ mn mo ms mt nc nd ne nh nj nm nv ny oh ok or pa ri sc sd tn tx ut va vt \ wa wi wv wy; do #chmod 755 /srv3/bsa/gschwarz/statsgo/data/$state/spatial/info/* #chmod 755 /srv3/bsa/gschwarz/statsgo/data/$state/spatial/$state/*
cd /srv3/bsa/gschwarz/statsgo/data/
$state/spatial /gis2/esri70/arcexe70/programs/arc<<-::::
&r /srv3/bsa/gschwarz/statsgo/layer_out $state
&r /srv3/bsa/gschwarz/statsgo/comp_out $state q :::: done

4. The SAS program "setussoils.sas" used to read the ascii files created by "layer_out.aml" and "comp_out.aml", perform averages of the data, merge the information from the layer file into the component file, and aggregate the component level information into a file having mapunit as the unit of observation. The resulting "map unit" file is output as both an ascii, comma-delimited file and a SAS file.

/* Program to read the conterminous state statsgo ascii info files, comp.state and layer.state, and calculate summary statistics by muid. The program prints an ascii file which is then passed back to info in a latter step.

Program written by Greg Schwarz, 4/24/95.

The program uses the SAS macro language to perform iterative appends to the main database. Two database files are created, an ascii file ussoils.dat containing comma-delimited data, and a SAS dataset, ussoils.ssd. To iteratively build the files, we use the mod option of the file statement for the ascii file, and proc append for the SAS file.

The program reads in the layer.state file (where state refers to the state name and is updated as the program iterates through the do loop. The variables taken from this file are:

muid character map unit identifier (first two characters are the state abbreviation).

seqnum integer sequence number identifying the component (there are up to 21 components in a map unit).

laydeph integer depth of lower boundary of the layer (in inches). There are no more than 6 layers to a component

laydepl integer depth of upper boundary of the layer (in inches).

awch float high range of available water capacity (in inches per inch) for the given layer/component/mapunit.

awcl float low range of available water capacity (in inches per inch).

clayh float high range of percent of soil consisting of clay (in percent of material less than 2mm in size).

clayl float low range of percent of soil consisting of clay (in percent).

kffact float actual k factor used in universal soil loss equation to calculate soil loss by water.

llh float high range of liquid limit of soil layer (in percent moisture by weight).

lll float low range of liquid limit of soil layer (in percent moisture by weight).

omh float high range of organic material in the soil (in percent by weight).

oml float low range of organic material in the soil (in percent by weight).

permh float high range of the permeability of the soil (in inches per hour).

perml float low range of the permeability of the soil (in inches per hour).

First, we compute the average of the high and low values for those variables expressed as a range. We then average the varaiables over all layers using the layer thickness (laydeph - laydepl) as weights. The final summary layer file contains a single weighted value for each component of each mapunit.

The program then reads in the component file comp.state for each state. The variables read in are:

muid character the map unit identifier

seqnum integer the component number

compname character the name of the component (contains useful information for tagging certain types of components as explained below).

compkind character a one character code useful for tagging certain types of components as explained below.

comppct integer the percent of the mapunit covered by the particular component.

drainage character a two character code identifying the quality of the drainage for the component. The codes are E = excessive, SE = somewhat excessive, W = well drained, MW = moderately drained, SP = somewhat poorly drained, P = poorly drained, and VP = very poorly drained. These codes are converted into numeric values and assigned to the variable drain as follows: E = 1, SE = 2, W = 3, MW = 4, SP = 5, P = 6 and VP = 7.

hydgrp character a three digit code identifying the hydrologic characteristics of the soil. The codes are defined in the Statsgo information guide. We convert the character codes into numeric codes according to Battaglin's methods. The numeric codes are assigned to the variable hygrp. The codes are A = 1, B = 2, C = 3, D, A/D, B/D, and C/D = 4. Also, we subselect areas and assign values for hygrp. Miscellaneous areas (denoted by M in compkind) and labeled as Dumps, and Gullied Land in compname are assigned the hygrp = 2.5 if the hydgrp value is missing. Areas denoted as Pits, Rock Outcrops, Terrace Escarpments, and Urban land with missing hydgrp are assigned a hygrp of 4.

hydric character Hydric soil rating, Y = hydric, N = non-hydric.

slope float The slope of the component (in percent). The value read in from the comp.state file is an average of the high and low range values stored in the INFO comp file for that state.

anflood character Frequency of annual flooding. Three classes, frequent (FREQ) - greater than 50%, occasional (OCCAS) 5-50% chance, and rare (RARE) less than 5% chance.

The layer file and the comp file are merged together by muid and seqnum. Water denoted components (from compname) are assigned missing values for all characteristics except comppct. The numeric variables are then averaged over all

components within a mapunit using the comppct as weights. The final file gives one observation per map unit. Note that any remaining missing values are assigned the value of -.1. */

libname dir ''; filename outfile '/srv3/bsa/gschwarz/statsgo/ussoils.dat' ;

/* Define the states for dynamically allocating files */

%let state1 = al ; %let state2 = ar ; %let state3 = az ; %let state4 = ca ; %let state5 = co ; %let state6 = ct ; %let state7 = de ; %let state8 = fl ; %let state9 = ga ; %let state10 = ia ; %let state11 = id ; %let state12 = il ; %let state13 = in ; %let state14 = ks ; %let state15 = ky ; %let state16 = la ; %let state17 = ma ; %let state18 = md ; %let state19 = me ; %let state20 = mi ; %let state21 = mn ; %let state22 = mo ; %let state23 = ms ; %let state24 = mt ; %let state25 = nc ; %let state26 = nd ; %let state27 = ne ; %let state28 = nh ; %let state29 = nj ; %let state30 = nm ; %let state31 = nv ; %let state32 = ny ; %let state33 = oh ; %let state34 = ok ; %let state35 = or ; %let state36 = pa ; %let state37 = ri ; %let state38 = sc ; %let state39 = sd ; %let state40 = tn ; %let state41 = tx ; %let state42 = ut ; %let state43 = va ; %let state44 = vt ; %let state45 = wa ; %let state46 = wi ; %let state47 = wv ; %let state48 = wy ;

/* Begin the macro */

%macro loopy ;

/* Iterate over conterminous states */

%do iter = 1 %to 48 ;

option dquote ;

/* Dynamically define the layer and comp files for processing (by state) */

filename indatal "~/statsgo/layer.&&&state&iter" ; filename indatac "~/statsgo/comp.&&&state&iter" ;

/* Read in the layer specific data for each state */

data one ; infile indatal missover ; input muid $ 2-8 seqnum 10-11 laydeph 13-14 laydepl 16-17 awch 19-22 awcl 24-27 clayh 29-30 clayl 32-33 kffact 35-38 omh 40-43 oml 45-48 permh 50-54 perml 56-60 llh 62-64 lll 66-68 ;

/* Compute the thickness of each layer and the thickness weighted values of awc, clay, kffact, om, and perm. If a range is given for a variable, then take the average of the range */

thick = laydeph - laydepl ; awc = thick*(awch + awcl)/2 ; clay = thick*(clayh + clayl)/2 ; kffact = thick*kffact ; om = thick*(omh + oml)/2 ; perm = thick*(permh + perml)/2 ; ll = thick*(llh+lll)/2 ;

/* m(varname) stores the thickness of layers in which missing values for varname are

```
encountered. This information is necessary to ensure we normalize the weights
correctly later in the program */

if awc = . then mawc = thick ; else mawc = 0 ; if clay = . then mclay = thick ; else
mclay = 0 ; if kffact = . then mkffact = thick ; else mkffact = 0 ; if om = . then mom =
thick ; else mom = 0 ; if perm = . then mperm = thick ; else mperm = 0 ; if ll = . then
mll = thick ; else mll = 0 ;

keep muid seqnum thick awc clay kffact om perm ll mawc mclay mkffact mom
mperm mll ;

proc sort ; by muid seqnum ;

/* Compute the sum of the thickness*varname over all layers. Also accumulate the
thickness of layers where varname is missing */

proc means noprint ; var thick awc clay kffact om perm ll mawc mclay mkffact mom
mperm mll ; by muid seqnum ; output out = layer sum = thick awc clay kffact om
perm ll mawc mclay mkffact mom mperm mll ;

/* Read in the state component files */

data comp ; infile indatac missover ; input muid $ 2-7 seqnum 10-11 compname $ 13-
42 compkind $ 44 comppct 46-48 drainage $ 50-54 hydgrp $ 62-64 hydric $ 66 slope
68-69 anflood $ 71-74 ;

proc sort; by muid seqnum ;

data comp ; merge comp layer ; by muid seqnum ;

/* Recode the hydgrp data to numeric values (see Battaglin) */

if hydgrp = 'A ' then hygrp = 1 ; else if hydgrp = 'B ' then hygrp = 2 ; else if hydgrp =
'C ' then hygrp = 3 ; else if hydgrp = 'D ' then hygrp = 4 ; else if hydgrp = 'A/D' then
hygrp = 4 ; else if hydgrp = 'B/D' then hygrp = 4 ; else if hydgrp = 'C/D' then hygrp =
4 ; else hygrp = . ;

/* Recode the drainage data to numeric values */

if drainage = 'A ' then drain = 4.0 ; else if drainage = 'E ' then drain = 1.0 ; else if
drainage = 'E,MW ' then drain = 2.5 ; else if drainage = 'E,P ' then drain = 3.5 ; else if
drainage = 'E,SE ' then drain = 1.5 ; else if drainage = 'E,W ' then drain = 2.0 ; else if
drainage = 'MW ' then drain = 4.0 ; else if drainage = 'MW,A ' then drain = 4.0 ; else
if drainage = 'MW,P ' then drain = 5.0 ; else if drainage = 'MW,SE' then drain = 3.0 ;
else if drainage = 'MW,SP' then drain = 4.5 ; else if drainage = 'MW,W ' then drain =
3.5 ; else if drainage = 'P ' then drain = 6.0 ; else if drainage = 'P,A ' then drain = 5.0 ;
else if drainage = 'P,SP ' then drain = 5.5 ; else if drainage = 'P,VP ' then drain = 6.5 ;
else if drainage = 'PD,A ' then drain = 5.0 ; else if drainage = 'SE ' then drain = 2.0 ;
else if drainage = 'SE,E ' then drain = 1.5 ; else if drainage = 'SE,MW' then drain =
3.0 ; else if drainage = 'SO ' then drain = 5.0 ; else if drainage = 'SP ' then drain = 5.0 ;
```

```
else if drainage = 'SP,A ' then drain = 4.5 ; else if drainage = 'SP,E ' then drain = 3.0 ;
else if drainage = 'SP,MW' then drain = 4.5 ; else if drainage = 'SP,P ' then drain =
5.5 ; else if drainage = 'SP,VP' then drain = 6.0 ; else if drainage = 'SP,W ' then drain
= 4.0 ; else if drainage = 'SW ' then drain = 4.0 ; else if drainage = 'VP ' then drain =
7.0 ; else if drainage = 'VP,P ' then drain = 6.5 ; else if drainage = 'VP,SP' then drain
= 6.0 ; else if drainage = 'W ' then drain = 3.0 ; else if drainage = 'W,A ' then drain =
3.5 ; else if drainage = 'W,E ' then drain = 2.5 ; else if drainage = 'W,MW ' then drain
= 3.5 ; else if drainage = 'W,SE ' then drain = 2.5 ; else if drainage = 'W,SP ' then
drain = 4.0 ; else if drainage = 'W,VP ' then drain = 5.0 ; else if drainage = 'WD ' then
drain = 3.0 ; else drain = . ;

/* Recode the anflood data */

if anflood = 'FREQ' then afldfreq = 1 ; else if anflood = 'OCCA' then afldfreq = 2 ;
else if anflood = 'RARE' then afldfreq = 3 ; else if anflood = 'NONE' then afldfreq =
4 ; else afldfreq = . ;

/* Recode the hydric data */

if hydric = 'Y' then ifhyd = 1 ; else if hydric = 'N' then ifhyd = 0 ; else ifhyd = . ;

/* Assign default values to components denoted as Miscellaneous areas */

if compkind = 'M' then do ;

if compname = 'BEACHES' then do ; if drain = . then drain = 6 ; end ; if compname =
'COASTAL BEACHES' then drain = 6 ; if compname = 'COASTAL DUNES' then
clay = 1 ; if compname = 'DUMPS' then do ; if hygrp = . then hygrp = 4 ; end ; if
compname = 'GULLIED LAND' then do ; if hygrp = . then hygrp = 2.5 ; end ; if
compname = 'LAVA FLOWS' then do ; if clay = . then clay = 0 ; end ; if compname
= 'PITS' then do ; if clay = . then clay = .5 ; if hygrp = . then hygrp = 2.5 ; end ; if
compname = 'ROCK OUTCROP' then do ; if hygrp = . then hygrp = 4 ; end ; if
compname = 'TERRACE ESCARPMENTS' or compname = 'URBAN LAND' or
compname = 'URBANLAND' then hygrp = 4 ;

end ;

/* Set numeric data to missing if the component is WATER */

if compname = 'WATER' then do ; thick = . ; awc = . ; clay = . ; kffact = . ; om = . ;
perm = . ; hygrp = . ; drain = . ; slope = . ; ll = . ; ifhyd = . ; afldfreq = . ; end ;

/* Compute the component weighted values, and normalize for thickness. Set the
variable to missing if thickness equals m(varname). Other- wise, normalize the layer
weights by dividing by the total non- missing thickness of all the layers. */

if mawc = thick then awc = . ; else awc = comppct*awc/(thick - mawc) ; if mclay =
thick then clay = . ; else clay = comppct*clay/(thick - mclay) ; if mkffact = thick then
kffact = . ; else kffact = comppct*kffact/(thick - mkffact) ; if mom = thick then om = .
; else om = comppct*om/(thick - mom) ; if mperm = thick then perm = . ; else perm =
```

```
comppct*perm/(thick - mperm) ; if mll = thick then ll = . ; else ll = comppct*ll/(thick
- mll) ; thick = comppct*thick ;

hygrp = comppct*hygrp ; drain = comppct*drain ; slope = comppct*slope ; ifhyd =
comppct*ifhyd ; afldfreq = comppct*afldfreq ;

/* m(varname) stores the component pct of components in which missing values for
varname are encountered. This information is necessary to ensure we normalize the
weights correctly later in the program */

if awc = . then mawc = comppct ; else mawc = 0 ; if clay = . then mclay = comppct ;
else mclay = 0 ; if kffact = . then mkffact = comppct ; else mkffact = 0 ; if om = . then
mom = comppct ; else mom = 0 ; if perm = . then mperm = comppct ; else mperm =
0 ; if ll = . then mll = comppct ; else mll = 0 ; if thick = . then mthick = comppct ; else
mthick = 0 ; if hygrp = . then mhygrp = comppct ; else mhygrp = 0 ; if drain = . then
mdrain = comppct ; else mdrain = 0 ; if slope = . then mslope = comppct ; else mslope
= 0 ; if ifhyd = . then mifhyd = comppct ; else mifhyd = 0 ; if afldfreq = . then mafldf
= comppct ; else mafldf = 0 ;

keep muid seqnum comppct awc clay kffact om perm thick hygrp drain slope ll ifhyd
afldfreq mawc mclay mkffact mom mperm mll mthick mhygrp mdrain mslope
mifhyd mafldf ;

/* Sum the comppct*varname over components Accumulate the missing comppct for
each varname */

proc means data = comp noprint ; var comppct awc clay kffact om perm thick hygrp
drain slope ll ifhyd afldfreq mawc mclay mkffact mom mperm mll mthick mhygrp
mdrain mslope mifhyd mafldf ; by muid ; output out = mapunit sum = comppct awc
clay kffact om perm thick hygrp drain slope ll ifhyd afldfreq mawc mclay mkffact
mom mperm mll mthick mhygrp mdrain mslope mifhyd mafldf ;

data mapunit ; set mapunit ;

/* Normalize the averaged data for comppct. Set the variable to missing if comppct
equals m(varname). Other- wise, normalize the comppct weights by dividing by the
total non- missing comppct of all the components. */

if mawc = comppct then awc = . ; else awc = awc / (comppct - mawc) ; if mclay =
comppct then clay = . ; else clay = clay / (comppct - mclay) ; if mkffact = comppct
then kffact = . ; else kffact = kffact / (comppct - mkffact) ; if mom = comppct then om
= . ; else om = om / (comppct - mom) ; if mperm = comppct then perm = . ; else perm
= perm / (comppct - mperm) ; if mthick = comppct then thick = . ; else thick = thick /
(comppct - mthick) ; if mhygrp = comppct then hygrp = . ; else hygrp = hygrp /
(comppct - mhygrp) ; if mdrain = comppct then drain = . ; else drain = drain /
(comppct - mdrain) ; if mslope = comppct then slope = . ; else slope = slope /
(comppct - mslope) ; if mll = comppct then ll = . ; else ll = ll / (comppct - mll) ; if
mifhyd = comppct then ifhyd = . ; else ifhyd = ifhyd / (comppct - mifhyd) ; if mafldf
= comppct then afldfreq = . ; else afldfreq = afldfreq / (comppct - mafldf) ;
```

```
/* Extract the state abbreviation from the muid */

state = substr(muid,1,2) ;

/* Set missing values to -.1 */

if awc = . then awc = -.1 ; if clay = . then clay = -.1 ; if kffact = . then kffact = -.1 ; if
om = . then om = -.1 ; if perm = . then perm = -.1 ; if thick = . then thick = -.1 ; if
hygrp = . then hygrp = -.1 ; if drain = . then drain = -.1 ; if slope = . then slope = -.1 ;
if ll = . then ll = -.1 ; if ifhyd = . then ifhyd = -.1 ; if afldfreq = . then afldfreq = -.1 ;

com = ',' ;

/* Append the state's map unit data to the ascii ussoils dataset */

file outfile mod ; put muid $ 1-7 com $ 8 state $ 9-10 com $ 11 awc 12-16 .2 com $
17 clay 18-21 .1 com $ 22 kffact 23-27 .2 com $ 28 om 29-32 .1 com $ 33 perm 34-
38 .2 com $ 39 thick 40-43 .1 com $ 44 hygrp 45-48 .1 com $ 49 drain 50-53 .1 com
$ 54 slope 55-58 .1 com $ 59 ll 60-64 .1 com $ 65 ifhyd 66-69 .1 com $ 70 afldfreq
71-74 .1 ;

drop _type_ _freq_ com mawc mclay mkffact mom mperm mll mthick mhygrp
mdrain mslope mifhyd mafldf ;

/* Append the state's map unit data to the SAS ussoils dataset */

proc append base = dir.ussoils data = mapunit ;

%end ;

%mend loopy ;

/* Execute the macro */

%loopy ;
```

5. The AML "ussoils_muid_atts.aml" used to read the ascii file created by the SAS program and create the PAT coverage "ussoils.muid_atts."

```
/*------------------------------------------------------------------------ /* /* Command name:
USSOILS_MUID_ATTS.AML /* Language:
AML /* /*:::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::: /* /* Purpose: Program
creates the INFO attribute table USSOILS.MUID_ATTS /* from the computed
averages of STATSGO variables created by /* the SAS program
setussoils.sas. /* /*:::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::: /* /*
Comments: /* 1. Item description: /* AWC = available water capacity
(inches/inch) /* CLAY = clay content of soil (% of soil < 2mm in size) /* KFFACT =
soil erodibility f-factor /* OM = organic matter content (% by weight) /* PERM =
permeability rates (inches/hour) /* THICK = total thickness of all sampled soil layers
(inches) /* HYGRP = soil index variables (1=well drained to 4=poorly drained) /*
```

DRAIN = soil index variable (1=well drained to 7=poorly drained) /* SLOPE = average slope (%) /* LL = liquid limit (percent moisture by weight) /* IFHYDRIC = hydric soil indicator (1 if hydric) /* AFLDFREQ = annual flood frequency (1 = frequent (>50% chance) /* 2 = occasional (5-50% chance), 3 = rare (<5% chance)) /* /* 2. Relate the USSOILS.PAT file to USSOILS.MUID_ATTS to determine map unit /* identifiers for map units that are in USSOILS.PAT but not in /* COMP or LAYER files, and thus not in USSOILS.MUID_ATTS. These /* missing MUIDs are then written to a temporary file, where they are /* summarized (to eliminate redundancies from multiple polygons in /* USSOILS.PAT having the same MUIDs), and then added to /* USSOILS.MUID_ATTS. /* /* 3. The missing MUIDs added into USSOILS.MUID_ATTS have no attribute /* information. We reselect these MUIDs and assign missing values to /* all the items, except for STATE. To fill in STATE, we create the /* redefined item STID that consists of the first two characters of /* MUID. We then move this value into the value for STATE. /* /*::: /* /* History: /* Author/Site, Date, Event /* ---------- /* R. Alexander/G. Schwarz 04/24/95 CREATED /* R. Alexander/G. Schwarz 09/08/95 Modified to create /* USSOILS.MUID_ATTS only /* and to include missing /* MUIDs in the /* USSOILS.MUID_ATTS
file. /* /*::: /* &DATA arc info
ARC /* CALC $NM = 1 CALC $COMMA-SWITCH = -1 CALC $PRINTER-SIZE =
200 /*===
DEFINE USSOILS.MUID_ATTS MUID,7,7,C STATE,2,2,C AWC,4,5,F,2 CLAY,4,4,F,1 KFFACT,4,5,F,2 OM,4,4,F,1 PERM,4,5,F,2 THICK,4,4,F,1 HYGRP,4,4,F,1 DRAIN,4,4,F,1 SLOPE,4,4,F,1 LL,4,5,F,1 IFHYDRIC,4,4,F,1 AFLDFREQ,4,4,F,1

/* ADD FROM /srv3/bsa/gschwarz/statsgo/ussoils.dat SEL USSOILS.MUID_ATTS SORT MUID /* /* Create temporary file FILE1 to hold missing values. /* SEL USSOILS.MUID_ATTS REDEFINE 1 STID 2 2 C

MODIFY FILE1 /* /* Find missing MUIDs in USSOILS.PAT and put in FILE1 /* SEL USSOILS.PAT RELATE USSOILS.MUID_ATTS 1 MUID ORDER RESEL MUID NE $1MUID RESEL MUID NE '' RELATE FILE1 2 MUID INIT MOVE MUID TO $2MUID SEL FILE1 SORT MUID /* /* Relate FILE1 to USSOILS.MUID_ATTS by MUID and do SUMMARY /* RELATE USSOILS.MUID_ATTS 1 MUID SUMMARY /* /* set all MUID not in COMP files with water designation to missing /* CALC $1AWC = -0.1 CALC $1CLAY = -0.1 CALC $1KFFACT = -0.1 CALC $1OM = -0.1 CALC $1PERM = -0.1 CALC $1THICK = -0.1 CALC $1HYGRP = -0.1 CALC $1DRAIN = -0.1 CALC $1SLOPE = -0.1 CALC $1LL = -0.1 CALC $1IFHYDRIC = -0.1 CALC $1AFLDFREQ = -0.1 MOVE STID TO $1STATE /* /* Delete the temporary file FILE1 /* SEL FILE1 ERASE FILE1 Y

SEL USSOILS.MUID_ATTS SORT MUID /* Q STOP &END DROPITEM USSOILS.MUID_ATTS USSOILS.MUID_ATTS STID

6. The AML 'ussoils_atts.aml' which may be used to transfer the attribute infor contained in the attribute table USSOILS.MUID_ATTS to the polygon attribute tabl USSOILS.PAT to permit mapping the attribute information.

/*---------- /* /* Command name: USSOILS_ATTS.AML /* Language: AML /* /*:::::::::: /* /* Purpose: Program creates attribute information for the national /* coverage USSOILS.PAT. The attribute information is taken from the /* info file USSOILS.MUID_ATTS. /* /*:::::::::: /* /* Comments: /* 1. Item description: /* AWC = available water capacity (inches/inch) /* CLAY = clay content of soil (% of soil < 2mm in size) /* KFFACT = soil erodibility f-factor /* OM = organic matter content (% by weight) /* PERM = permeability rates (inches/hour) /* THICK = total thickness of all sampled soil layers (inches) /* HYGRP = soil index variables (1=well drained to 4=poorly drained) /* DRAIN = soil index variable (1=well drained to 7=poorly drained) /* SLOPE = average slope (%) /* LL = liquid limit (percent moisture by weight) /* IFHYDRIC = hydric soil indicator (1 if hydric) /* AFLDFREQ = annual flood frequency (1 = frequent (>50% chance) /* 2 = occasional (5-50% chance), 3 = rare (<5% chance)) /* /* 2. Items are ADDED to USSOILS.PAT, then we RELATE to USSOILS.MUID_ATTS /* on the basis of MUID. Note that there are 3 MUIDS contained in /* USSOILS.MUID_ATTS that are not in USSOILS.PAT. /* /*:::::::::: /* /* History: /* Author/Site, Date, Event /* ---------- ---- /* R. Alexander/G. Schwarz 09/08/95 CREATED /*:::::::::: /* ADDITEM USSOILS.PAT USSOILS.PAT STATE 2 2 C ADDITEM USSOILS.PAT USSOILS.PAT AWC 4 5 F 2 ADDITEM USSOILS.PAT USSOILS.PAT CLAY 4 4 F 1 ADDITEM USSOILS.PAT USSOILS.PAT KFFACT 4 5 F 2 ADDITEM USSOILS.PAT USSOILS.PAT OM 4 4 F 1 ADDITEM USSOILS.PAT USSOILS.PAT PERM 4 5 F 2 ADDITEM USSOILS.PAT USSOILS.PAT THICK 4 4 F 1 ADDITEM USSOILS.PAT USSOILS.PAT HYGRP 4 4 F 1 ADDITEM USSOILS.PAT USSOILS.PAT DRAIN 4 4 F 1 ADDITEM USSOILS.PAT USSOILS.PAT SLOPE 4 4 F 1 ADDITEM USSOILS.PAT USSOILS.PAT LL 4 5 F 1 ADDITEM USSOILS.PAT USSOILS.PAT IFHYDRIC 4 4 F 1 ADDITEM USSOILS.PAT USSOILS.PAT AFLDFREQ 4 4 F 1 /* &DATA arc info ARC /* CALC $NM = 1 CALC $COMMA-SWITCH = -1 CALC $PRINTER-SIZE = 200 /*========== SEL USSOILS.PAT RELATE USSOILS.MUID_ATTS 1 MUID ORDER MOVE $1STATE TO STATE CALC AWC = $1AWC CALC CLAY = $1CLAY CALC KFFACT = $1KFFACT CALC OM = $1OM CALC PERM = $1PERM CALC THICK = $1THICK CALC HYGRP = $1HYGRP CALC DRAIN = $1DRAIN CALC SLOPE = $1SLOPE CALC LL = $1LL CALC IFHYDRIC = $1IFHYDRIC CALC AFLDFREQ = $1AFLDFREQ /* Q STOP &END &RETURN

Time_Period_of_Content:

Time_Period_Information:

Calendar_Date: Unknown

Status:

Progress: Complete

Maintenance_and_Update_Frequency:

As Needed

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -127.88685968
East_Bounding_Coordinate: -65.34551784
North_Bounding_Coordinate: 48.24566548
South_Bounding_Coordinate: 22.94132336

Keywords:
Theme:
Theme_Keyword_Thesaurus: None
Theme_Keyword:
State Soil Geographic (STATSGO) Data Base for the Conterminous United States
Place:
Place_Keyword_Thesaurus: None
Place_Keyword: Conterminous U.S.
Stratum:
Stratum_Keyword_Thesaurus: None
Stratum_Keyword: None
Temporal:
Temporal_Keyword_Thesaurus: None
Temporal_Keyword: None

Access_Constraints:
None

Use_Constraints:
The National Resource Conservation Service recommends that the data not be used to describe soil characteristics for regions smaller than a multi-county area.

Point_of_Contact:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Gregory E. Schwarz
Contact_Organization: U.S. Geological Survey, Water Resources Div. (WRD)
Contact_Position: Economist, Branch of Systems Analysis
Contact_Address:
Address_Type: mailing address
Address: 12201 Sunrise Valley Drive, MS 410
City: Reston
State_or_Province: VA
Postal_Code: 20191
Country: USA
Contact_Voice_Telephone: 703-648-5718
Contact_Facsimile_Telephone: 703-648-5295
Contact_Electronic_Mail_Address: gschwarz@usgs.gov
Hours_of_Service: 9:00am-5:00pm EST
Contact_Instructions: Please contact thru email

Data_Set_Credit:
See References

Security_Information:
Security_Classification_System: None
Security_Classification: Unclassified
Security_Handling_Description: None

Native_Data_Set_Environment: dgux, 5.4R3.10, AViiON UNIX, ARC/INFO version 7.0.4
Cross_Reference:
Citation_Information:
Originator:
U.S. Dept. of Agriculture, Soil Conservation Service, National Coop. Soil Survey
Publication_Date: October 1994
Title:
State Soil Geographic (STATSGO) Data Base: U.S. Coverage by States ...
Geospatial_Data_Presentation_Form: map
Other_Citation_Details: ARC/INFO 7.0 Coverage on CDROM

Data_Quality_Information:
Attribute_Accuracy:
Attribute_Accuracy_Report: See Entity_Attribute_Information
Quantitative_Attribute_Accuracy_Assessment:
Attribute_Accuracy_Value: See Explanation
Attribute_Accuracy_Explanation:
Attribute accuracy is described, where present, with each attribute defined in the Entity and Attribute Section.
Logical_Consistency_Report: Polygon topology present.
Lineage:
Source_Information:
Source_Scale_Denominator: 250,000
Process_Step:
Process_Description:
GSCHWARZ MAPJOIN /SRV3/BSA/GSCHWARZ/STATSGO/USSOILS POLY NONE
Source_Used_Citation_Abbreviation: None
Process_Date: 19950419
Process_Time: 1840
Source_Produced_Citation_Abbreviation: None
Process_Step:
Process_Description: GSCHWARZ
ARCEDIT /SRV3/BSA/GSCHWARZ/STATSGO/USSOILS
Source_Used_Citation_Abbreviation: None
Process_Date: 19950420
Process_Time: 1154
Source_Produced_Citation_Abbreviation: None
Process_Step:
Process_Description: GSCHWARZ
BUILD /SRV3/BSA/GSCHWARZ/STATSGO/USSOILS POLY
Source_Used_Citation_Abbreviation: None
Process_Date: 19950420
Process_Time: 1213
Source_Produced_Citation_Abbreviation: None
Process_Step:
Process_Description: GSCHWARZ DOCUMENT USSOILS UPDATE GSCHWARZ

Source_Used_Citation_Abbreviation: None
Process_Date: 19950717
Process_Time: 1413
Source_Produced_Citation_Abbreviation: None

Process_Step:
Process_Description: GSCHWARZ DOCUMENT USSOILS UPDATE GSCHWARZ
Source_Used_Citation_Abbreviation: None
Process_Date: 19950717
Process_Time: 1454
Source_Produced_Citation_Abbreviation: None

Process_Step:
Process_Description: GSCHWARZ DOCUMENT USSOILS UPDATE GSCHWARZ
Source_Used_Citation_Abbreviation: None
Process_Date: 19950717
Process_Time: 1536
Source_Produced_Citation_Abbreviation: None

Process_Step:
Process_Description: GSCHWARZ DOCUMENT USSOILS UPDATE GSCHWARZ
Source_Used_Citation_Abbreviation: None
Process_Date: 19950717
Process_Time: 1708
Source_Produced_Citation_Abbreviation: None

Process_Step:
Process_Description: GSCHWARZ DOCUMENT USSOILS UPDATE GSCHWARZ
Source_Used_Citation_Abbreviation: None
Process_Date: 19950718
Process_Time: 0959
Source_Produced_Citation_Abbreviation: None

Process_Step:
Process_Description: GSCHWARZ DOCUMENT USSOILS UPDATE GSCHWARZ
Source_Used_Citation_Abbreviation: None
Process_Date: 19950719
Process_Time: 1506
Source_Produced_Citation_Abbreviation: None

Process_Step:
Process_Description: GSCHWARZ DOCUMENT USSOILS UPDATE GSCHWARZ
Source_Used_Citation_Abbreviation: None
Process_Date: 19950725
Process_Time: 1219
Source_Produced_Citation_Abbreviation: None

Process_Step:
Process_Description: GSCHWARZ DOCUMENT USSOILS UPDATE GSCHWARZ
Source_Used_Citation_Abbreviation: None
Process_Date: 19950725

Process_Time: 1613
Source_Produced_Citation_Abbreviation: None
Process_Step:
Process_Description: GSCHWARZ DOCUMENT USSOILS UPDATE GSCHWARZ
Source_Used_Citation_Abbreviation: None
Process_Date: 19950726
Process_Time: 1457
Source_Produced_Citation_Abbreviation: None
Process_Step:
Process_Description: GSCHWARZ DOCUMENT USSOILS UPDATE GSCHWARZ
Source_Used_Citation_Abbreviation: None
Process_Date: 19950726
Process_Time: 1502
Source_Produced_Citation_Abbreviation: None
Process_Step:
Process_Description: GSCHWARZ DOCUMENT USSOILS UPDATE GSCHWARZ
Source_Used_Citation_Abbreviation: None
Process_Date: 19950726
Process_Time: 1519
Source_Produced_Citation_Abbreviation: None
Process_Step:
Process_Description: GSCHWARZ DOCUMENT USSOILS UPDATE GSCHWARZ
Source_Used_Citation_Abbreviation: None
Process_Date: 19950802
Process_Time: 0931
Source_Produced_Citation_Abbreviation: None
Process_Step:
Process_Description: GSCHWARZ DOCUMENT USSOILS UPDATE GSCHWARZ
Source_Used_Citation_Abbreviation: None
Process_Date: 19950802
Process_Time: 1422
Source_Produced_Citation_Abbreviation: None
Process_Step:
Process_Description: GSCHWARZ DOCUMENT USSOILS UPDATE GSCHWARZ
Source_Used_Citation_Abbreviation: None
Process_Date: 19950803
Process_Time: 1457
Source_Produced_Citation_Abbreviation: None
Process_Step:
Process_Description: GSCHWARZ DOCUMENT USSOILS UPDATE GSCHWARZ
Source_Used_Citation_Abbreviation: None
Process_Date: 19950803
Process_Time: 1538
Source_Produced_Citation_Abbreviation: None

Process_Step:
Process_Description: GSCHWARZ DOCUMENT USSOILS DELETE GSCHWARZ
Source_Used_Citation_Abbreviation: None
Process_Date: 19950803
Process_Time: 1538
Source_Produced_Citation_Abbreviation: None
Process_Step:
Process_Description: GSCHWARZ DOCUMENT USSOILS UPDATE GSCHWARZ
Source_Used_Citation_Abbreviation: None
Process_Date: 19950803
Process_Time: 1558
Source_Produced_Citation_Abbreviation: None
Process_Step:
Process_Description: GSCHWARZ DOCUMENT USSOILS UPDATE GSCHWARZ
Source_Used_Citation_Abbreviation: None
Process_Date: 19950803
Process_Time: 1611
Source_Produced_Citation_Abbreviation: None
Process_Step:
Process_Description: GSCHWARZ DOCUMENT USSOILS DELETE GSCHWARZ
Source_Used_Citation_Abbreviation: None
Process_Date: 19950803
Process_Time: 1611
Source_Produced_Citation_Abbreviation: None
Process_Step:
Process_Description: GSCHWARZ DOCUMENT USSOILS UPDATE GSCHWARZ
Source_Used_Citation_Abbreviation: None
Process_Date: 19950803
Process_Time: 1711
Source_Produced_Citation_Abbreviation: None
Process_Step:
Process_Description: GSCHWARZ DOCUMENT USSOILS UPDATE GSCHWARZ
Source_Used_Citation_Abbreviation: None
Process_Date: 19950804
Process_Time: 1530
Source_Produced_Citation_Abbreviation: None
Process_Step:
Process_Description: GSCHWARZ DOCUMENT USSOILS UPDATE GSCHWARZ
Source_Used_Citation_Abbreviation: None
Process_Date: 19950804
Process_Time: 1535
Source_Produced_Citation_Abbreviation: None
Process_Step:
Process_Description: GSCHWARZ DOCUMENT USSOILS UPDATE

GSCHWARZ
Source_Used_Citation_Abbreviation: None
Process_Date: 19950804
Process_Time: 1538
Source_Produced_Citation_Abbreviation: None
Process_Step:
Process_Description: GSCHWARZ DOCUMENT USSOILS UPDATE GSCHWARZ
Source_Used_Citation_Abbreviation: None
Process_Date: 19950804
Process_Time: 1553
Source_Produced_Citation_Abbreviation: None
Process_Step:
Process_Description: GSCHWARZ DOCUMENT USSOILS UPDATE GSCHWARZ
Source_Used_Citation_Abbreviation: None
Process_Date: 19950804
Process_Time: 1612
Source_Produced_Citation_Abbreviation: None
Process_Step:
Process_Description: GSCHWARZ DOCUMENT USSOILS UPDATE GSCHWARZ
Source_Used_Citation_Abbreviation: None
Process_Date: 19950804
Process_Time: 1615
Source_Produced_Citation_Abbreviation: None
Process_Step:
Process_Description: GSCHWARZ DOCUMENT USSOILS UPDATE GSCHWARZ
Source_Used_Citation_Abbreviation: None
Process_Date: 19950804
Process_Time: 1619
Source_Produced_Citation_Abbreviation: None
Process_Step:
Process_Description: GSCHWARZ DOCUMENT USSOILS UPDATE GSCHWARZ
Source_Used_Citation_Abbreviation: None
Process_Date: 19950804
Process_Time: 1622
Source_Produced_Citation_Abbreviation: None
Process_Step:
Process_Description: GSCHWARZ DOCUMENT USSOILS UPDATE GSCHWARZ
Source_Used_Citation_Abbreviation: None
Process_Date: 19950804
Process_Time: 1627
Source_Produced_Citation_Abbreviation: None
Process_Step:
Process_Description: GSCHWARZ DOCUMENT USSOILS UPDATE GSCHWARZ
Source_Used_Citation_Abbreviation: None

Process_Date: 19950808
Process_Time: 1059
Source_Produced_Citation_Abbreviation: None
Process_Step:
Process_Description: GSCHWARZ DOCUMENT USSOILS UPDATE GSCHWARZ
Source_Used_Citation_Abbreviation: None
Process_Date: 19950808
Process_Time: 1105
Source_Produced_Citation_Abbreviation: None
Process_Step:
Process_Description: GSCHWARZ DOCUMENT USSOILS DELETE GSCHWARZ
Source_Used_Citation_Abbreviation: None
Process_Date: 19950811
Process_Time: 0931
Source_Produced_Citation_Abbreviation: None
Process_Step:
Process_Description: GSCHWARZ EXPORT COVER USSOILS USSOILS
Source_Used_Citation_Abbreviation: None
Process_Date: 19950811
Process_Time: 1551
Source_Produced_Citation_Abbreviation: None
Process_Step:
Process_Description:
GSCHWARZ
COPY /SRV3/BSA/GSCHWARZ/STATSGO/USSOILS /SRV3/BSA/GSCHW
Source_Used_Citation_Abbreviation: None
Process_Date: 19950911
Process_Time: 1044
Source_Produced_Citation_Abbreviation: None
Process_Step:
Process_Description: GSCHWARZ DOCUMENT USSOILS UPDATE GSCHWARZ
Source_Used_Citation_Abbreviation: None
Process_Date: 19950911
Process_Time: 1210
Source_Produced_Citation_Abbreviation: None
Process_Step:
Process_Description: GSCHWARZ DOCUMENT USSOILS UPDATE GSCHWARZ
Source_Used_Citation_Abbreviation: None
Process_Date: 19950911
Process_Time: 1356
Source_Produced_Citation_Abbreviation: None
Process_Step:
Process_Description: GSCHWARZ DOCUMENT USSOILS UPDATE GSCHWARZ
Source_Used_Citation_Abbreviation: None
Process_Date: 19950911
Process_Time: 1401

Source_Produced_Citation_Abbreviation: None
Process_Step:
Process_Description: GSCHWARZ DOCUMENT USSOILS UPDATE GSCHWARZ
Source_Used_Citation_Abbreviation: None
Process_Date: 19950911
Process_Time: 1427
Source_Produced_Citation_Abbreviation: None
Process_Step:
Process_Description: GSCHWARZ EXPORT COVER USSOILS USSOILS FULL
Source_Used_Citation_Abbreviation: None
Process_Date: 19950911
Process_Time: 1531
Source_Produced_Citation_Abbreviation: None
Process_Step:
Process_Description: GSCHWARZ DOCUMENT USSOILS UPDATE GSCHWARZ
Source_Used_Citation_Abbreviation: None
Process_Date: 19950918
Process_Time: 1522
Source_Produced_Citation_Abbreviation: None
Process_Step:
Process_Description: MNEGRI IMPORT COVER /SCRATCH_AREA1/MNEGRI/USSOILS.E00 USSOILS
Source_Used_Citation_Abbreviation: None
Process_Date: 19950920
Process_Time: 1552
Source_Produced_Citation_Abbreviation: None
Process_Step:
Process_Description: MNEGRI EXPORT COVER /DSDL1/CUSA/TILES/CUSA/USSOILS USSOILS.E00 NONE
Source_Used_Citation_Abbreviation: None
Process_Date: 19950926
Process_Time: 1325
Source_Produced_Citation_Abbreviation: None
Process_Step:
Process_Description: MNEGRI EXPORT COVER /DSDL1/CUSA/TILES/CUSA/USSOILS USSOILS.E00
Source_Used_Citation_Abbreviation: None
Process_Date: 19960708
Process_Time: 1158
Source_Produced_Citation_Abbreviation: None
Cloud_Cover: Not Applicable

Spatial_Data_Organization_Information:
Direct_Spatial_Reference_Method: Vector
Point_and_Vector_Object_Information:
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Point
Point_and_Vector_Object_Count: 78518
SDTS_Terms_Description:
SDTS_Point_and_Vector_Object_Type: String
Point_and_Vector_Object_Count: 241658
SDTS_Terms_Description:
SDTS_Point_and_Vector_Object_Type: GT-polygon composed of chains
Point_and_Vector_Object_Count: 78519

Spatial_Reference_Information:
Horizontal_Coordinate_System_Definition:
Planar:
Map_Projection:
Map_Projection_Name: Albers Conical Equal Area
Albers_Conical_Equal_Area:
Standard_Parallel: 29.5
Standard_Parallel: 45.5
Longitude_of_Central_Meridian: -96
Latitude_of_Projection_Origin: 23
False_Easting: 0.00000
False_Northing: 0.00000
Planar_Coordinate_Information:
Planar_Coordinate_Encoding_Method: coordinate pair
Coordinate_Representation:
Abscissa_Resolution: 1.0
Ordinate_Resolution: 1.0
Planar_Distance_Units: METERS
Geodetic_Model:
Horizontal_Datum_Name: North American Datum of 1927
Ellipsoid_Name: Clarke 1866
Semi-major_Axis: 6378206.4
Denominator_of_Flattening_Ratio: 294.98

Entity_and_Attribute_Information:
Detailed_Description:
Entity_Type:
Entity_Type_Label: USSOILS.PAT
Entity_Type_Definition:
Selected items of hydrologic relevance from the STATSGO Data Base
Entity_Type_Definition_Source: STATSGO Data Base ARC/INFO 7.0 Coverage CD-ROM, October 1994
Attribute:
Attribute_Label: -
Attribute_Definition:
Selected items of hydrologic relevance from the STATSGO Data Base
Attribute_Definition_Source: STATSGO Data Base ARC/INFO 7.0 Coverage CD-ROM, October 1994

Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: -

Attribute:
Attribute_Label: AREA
Attribute_Definition: Area of poly in square coverage units
Attribute_Definition_Source: Computed
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Positive real numbers

Attribute:
Attribute_Label: PERIMETER
Attribute_Definition: Perimeter of polygon in coverage units
Attribute_Definition_Source: Computed
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Positive real numbers

Attribute:
Attribute_Label: USSOILS#
Attribute_Definition: Internal feature number
Attribute_Definition_Source: Computed
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Sequential unique positive integer

Attribute:
Attribute_Label: USSOILS-ID
Attribute_Definition: User-assigned feature number
Attribute_Definition_Source: User-defined
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Integer

Attribute:
Attribute_Label: MUID
Attribute_Definition: Mapunit Identification code - used to reference observations
Attribute_Definition_Source: STATSGO, October 1994
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Character

Attribute:
Attribute_Label: STATE
Attribute_Definition: 2-character State abbreviation
Attribute_Definition_Source: Created from first two characters of muid in STATSGO data base
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Character

Attribute:
Attribute_Label: AWC
Attribute_Definition: Available water capacity (inches per inch)
Attribute_Definition_Source:
Created from AWCH and AWCL in STATSGO (10/94) layer file - see

narrative

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Positive real numbers, missing value indicator = -0.1

Attribute:

Attribute_Label: CLAY

Attribute_Definition:

Percent clay in soil (percent of material less than 2mm in size)

Attribute_Definition_Source:

Created from clayh and clayl in STATSGO (10/94) layer file - see narrative

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0 to 100, missing value indicator = -0.1

Attribute:

Attribute_Label: KFFACT

Attribute_Definition:

Actual k factor used in water erosion component of universal soil loss equation

Attribute_Definition_Source: Created from STATSGO (10/94) component file - see narrative.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Non-negative real, missing value indicator = -0.1

Attribute:

Attribute_Label: OM

Attribute_Definition: Organic material in soil (in percent by weight)

Attribute_Definition_Source:

Created from omh and oml of STATSGO (10/94) layer file - see narrative

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0 to 100, missing value indicator = -0.1

Attribute:

Attribute_Label: PERM

Attribute_Definition: Permeability of the soil (in inches per hour)

Attribute_Definition_Source:

Created from permh and perml of STATSGO (10/94) layer file - see narrative

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Non-negative real, missing value indicator = -0.1

Attribute:

Attribute_Label: THICK

Attribute_Definition: Cumulative thickness of all soil layers (in inches)

Attribute_Definition_Source:

Created from laydeph and laydepl of STATSGO (10/94) layer file - see narrative

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Positive real, missing value indicator = -0.1

Attribute:

Attribute_Label: HYGRP
Attribute_Definition: Hydrologic characteristics of soil
Attribute_Definition_Source:
Created from hydgrp item of STATSGO (10/94) component file - see narrative
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value:
1-4:1=High infiltration,2=Mod infil,3=Slow infil,4=Very slow infil,-0.1=Miss

Attribute:
Attribute_Label: DRAIN
Attribute_Definition: Soil drainage
Attribute_Definition_Source:
Created from drainage in STATSGO (10/94) component file - see narrative
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value:
1-7:1=excess,2=mod excess,3=well,4=mod well,5=mod poor,6=poor,7=v poor,-.1=miss

Attribute:
Attribute_Label: SLOPE
Attribute_Definition: Surface slope (in percent)
Attribute_Definition_Source:
Created from slopeh and slopel of STATSGO (10/94) component file - see narrative
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: 0 to 100, missing value indicator = -0.1

Attribute:
Attribute_Label: LL
Attribute_Definition: Liquid limit of soil (in percent moisture by weight)
Attribute_Definition_Source:
Created from llh and lll of STATSGO (10/94) layer file - see narrative
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: 0 to 100, missing value indicator = -0.1

Attribute:
Attribute_Label: IFHYDRIC
Attribute_Definition: Share of map unit components with hydric soils
Attribute_Definition_Source:
Created from hydric of STATSGO (10/94) component file - see narrative
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value:
0 to 1 (1=all components hydric), missing value indicator = -0.1

Attribute:
Attribute_Label: AFLDFREQ
Attribute_Definition: Annual flood frequency
Attribute_Definition_Source:
Created from item anflood of STATSGO (10/94) component file - see narrative
Attribute_Domain_Values:

Enumerated_Domain:
Enumerated_Domain_Value:
1-4: 1=greater than 50 pct, 2=5 to 50 pct, 3=0 to 5 pct, 4=none, -0.1=missing

Overview_Description:
Entity_and_Attribute_Overview:
The attribute table, USSOILS.MUID_ATTS, contains the following items for each map unit:

Label Type Description

muid character Map unit identifier (first two characters are the state abbreviation).

state character 2-character State abbreviation.

awc float Available water capacity (in inches per inch). Computed as a layer thickness weighted average, across soil layers, of a simple average of awch and awcl contained in the STATSGO layer file. Missing value .FALSE.

clay float Percent of soil consisting of clay (in percent of material less than 2mm in size). Computed as a layer thickness weighted average, across soil layers, of a simple average of clayh and clayl contained in the STATSGO layer file. Missing value indicator = -0.1.

kffact float Actual k factor used in universal soil loss equation to calculate soil loss by water. Computed as a layer thickness weighted average, across soil layers, of the variable kffact contained in the STATSGO layer file. Missing value indicator = -0.1.

ll float Liquid limit of soil layer (in percent moisture by weight). Computed as a layer thickness weighted average, across soil layers, of a simple average of llh and lll contained in the STATSGO layer file. Missing value indicator = -0.1.

om float Organic material in the soil (in percent by weight). Computed as a layer thickness weighted average, across soil layers, of a simple average of omh and oml contained in the STATSGO layer file. Missing value .FALSE.

perm float Permeability of the soil (in inches per hour). Computed as a layer thickness weighted average, across soil layers, of a simple average of permh and perml contained in the STATSGO layer file. Missing value .FALSE.

thick float Depth of soil layers (in inches). Computed as the sum of the differences between laydeph and laydepl for each soil layer in the STATSGO layer file. Missing value .FALSE.

hygrp float A code identifying the hydrologic characteristics of the soil. The character codes defined in the STATSGO component file are converted into numeric codes according to Bill Battaglin's methods (Battaglin, written communication dated March 8, 1995). The coding transformations are A = 1 (high infiltration, deep soils, well drained to excessively drained sands and gravels), B = 2 (moderate infiltration rates, deep and moderately deep, moderately well and well drained soils with moderately

coarse textures), C = 3 (slow infiltration rates, soils with layers impeding downward movement of water, or soils with moderately fine or fine textures), D = 4 (very slow infiltration rates, soils are clayey, have a high water table, or are shallow to an impervious layer), Mixture codes A/D, B/D, and C/D are assigned the value 4. Also, we subselect certain areas and assign values for hygrp based on the area type. Miscellaneous areas (denoted by M in compkind) and labeled as Dumps, and Gullied Land in compname are assigned the hygrp = 2.5 if the hydgrp value is missing. Areas denoted as Pits, Rock Outcrops, Terrace Escarpments, and Urban land with missing hydgrp are assigned a hygrp of 4. See the documentation of the SAS program "setussoils.sas" for additional details. The transformed data are averaged across components using the component percentage as weights. The missing value indicator is - 0.1.

drain float A code identifying the quality of soil drainage. The two character code from the STATSGO component file is converted to a numeric value according to the following translation: E = 1 (excessive), SE = 2 (somewhat excessive), W = 3 (well drained), MW = 4 (moderately drained), SP = 5 (somewhat poorly drained), P = 6 (poorly drained), and VP = 7 (very poorly drained). The values are averaged across components using the component percentage as weights. The missing value indicator is -0.1.

slope float The slope of the map unit (in percent). Slope values contained in the STATSGO component file are averaged using the component percentage as weights. The missing value indicator is -0.1.

ifhydric float Share of map unit with hydric soils (1 = entire map unit has hydric soils). Computed by summing the component percentage for each component designated as having hydric soils according to the variable hydric in the STATSGO component file. Missing value .FALSE.

afldfreq float Annual flood frequency code. Flood frequency designations contained in the variable anflood in the STATSGO component file are converted to numeric codes according to the following translation: 1 = greater than 50%, 2 = 5% to 50%, 3 = 0% to 5%, and 4 = no flood. Translated variables are averaged across components using the component percentage as weights. The missing value indicator is -0.1.

Entity_and_Attribute_Detail_Citation: Not Available

Metadata_Reference_Information:
Metadata_Date: 19950918
Metadata_Contact:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Gregory E. Schwarz
Contact_Organization: U.S. Geological Survey, Water Resources Div. (WRD)
Contact_Position: Economist, Branch of Systems Analysis
Contact_Address:
Address_Type: mailing address
Address: 12201 Sunrise Valley Drive, MS 410

City: Reston
State_or_Province: VA
Postal_Code: 20191
Country: USA
Contact_Voice_Telephone: 703-648-5718
Contact_Facsimile_Telephone: 703-648-5295
Contact_Electronic_Mail_Address: gschwarz@usgs.gov
Hours_of_Service: 9:00am-5:00pm EST
Contact_Instructions: Please contact thru email
Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata
Metadata_Standard_Version: FGDC-STD-001-1998
Metadata_Time_Convention: Local Time
Metadata_Security_Information:
Metadata_Security_Classification_System: None
Metadata_Security_Classification: Unclassified
Metadata_Security_Handling_Description: None

Generated by mp version 2.4.15 on Tue Jun 22 13:34:59 1999

U.S. Department of the Interior, U.S. Geological Survey
Maintainer: Water Webserver Team